Parallel configuration in energy management control for the fuel cell-battery-ultracapacitor hybrid vehicles

Abstract:

This paper proposes a parallel energy-sharing configuration of energy management control for fuel cell hybrid vehicles (FCHVs) application. The hybrid energy source consists of fuel cells (FCs) and energy storage units (ESUs) made up of battery pack and ultracapacitor (UC) module. The aim of the control is to regulate the DC link voltage, which is connected to the traction DC motor via the h-bridge converter. Each source is connected to the DC bus/load using parallel active topology. A total of six control loops are constructed in a supervisory system in order to regulate the DC bus voltage, control of current flow and at the same time, to monitor the state of charge (SOC) of the energy storage devices. The effectiveness of the proposed parallel energy-sharing control system is discussed and analyzed and then verified by experiments.